DOCUMENT RESUME

ED 244 456 EC 162 469

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TITLE The Use of "Mild" Aversive Stimuli for Control of Stereotypic and Self-Injurious Behaviors.
PUB DATE Apr 83
NOTE 11p.; In: Meeting Their Needs: Provision of Services to the Severely Emotionally Disturbed and Autistic. p106-115. Conference Proceedings (Memphis, TN, April 27-28, 1983). (EC 162 463).
PUB TYPE Speeches/Conference Papers (150) -- Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Behavior Modification; Behavior Patterns; *Emotional Disturbances; Ethics; *Punishment; *Self Mutilation; Severe Disabilities
IDENTIFIERS *Aversive Stimuli

ABSTRACT

The use of mild aversives to control self-injurious and stereotypic behaviors of severely emotionally disturbed children is considered. Research is reviewed on the ethics and effectiveness of aversive stimuli. Mild aversives include a form of nonseclusionary timeout known as facial screening, the administration of certain irritating substances such as citric acid and aromatic ammonia, and the use of negative practice. Facial screening (in which the subject's face is covered blocking visual stimuli) studies are cited to show marked reduction of inappropriate behavior. Use of substances (water, lemon juice, and ammonia) is considered, and cautions to their use are listed. Finally, negative practice is characterized as a reduction procedure in which the student is required to engage in exaggerated experience with the inappropriate behavior. The effectiveness of such mild aversives is noted; and advantages of portability, easy administration, ease of training, lack of harm, and lack of expense are cited. (CL)

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ED244456

THE USE OF "MILD" AVERSIVE STIMULI FOR CONTROL OF STEREOTYPIC AND SELF-INJURIOUS BEHAVIORS

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One of the immediate priorities for teachers of severely emotionally disturbed children must be to gain control over self-injurious and stereotypic behaviors. These behaviors are of immediate concern because of the potential harm that they will cause the student, and because of the obstruction they present to instruction. Self-injurious behavior refers to behavior patterns that produce physical injury to the individual's own body (Bachman, 1972). These behaviors range from relatively mild self-slapping to such severe head banging and body biting that if the individual were permitted to engage in the behavior for any appreciable period of time the resultant tissue damage would be extensive and possibly life-threatening. Stereotypic behaviors are repetitious, topographically invariant motor acts, or sequences, for which reinforcing or controlling stimuli are unknown, and which are in a functional sense maladaptive (Baumeister & Forehand, 1973). Stereotypic behaviors interfere with attention and learning (Koegel & Covert, 1972), interfere with previously learned behaviors (Lovaas, Litrownk, & Maun, 1974), and interfere with observational learning (Varni, Lovaas, Koegel, & Everett, 1979).

In response to what were growing concerns in the area of treatment ethics, behavioral guidelines were adopted by the National Association for Retarded Citizens which emphasized the use of procedures regarded as least restrictive, i.e., differential reinforcement, extinction, exclusion time-out, response-cost and overcorrection. It was recommended that the use of any punishment procedure to reduce self-injurious behavior should be preceded by attempts to establish alternative behavior patterns through environmental stimulation and reinforcement (May, Risley, Twardosz, Friedman, Bijou, Wexler, et. al., 1975).

The literature suggests however that the use of such nonaversives has had limited effectiveness (Baumeister & Rollings, 1976). Altman and Haavik (1978) state that differential reinforcement response suppression occurs gradually over an extended time period; consequently a great deal of self-injury may occur in the process. Differential reinforcement being an insufficient procedure independent of a concurrent aversive procedure has been written about by Altman & Haavik (1978), Corte, Wolf, & Locke (1971), Dorsey, Iwata, Ong & McSween (1980), Risley (1968); this being especially the case with high frequency behaviors (Gaylord-Ross, Weeks, Lipner, and Gaylord-Ross, 1983). In reviewing techniques for reduction of such behaviors the most consistently found success has not been with reinforcement based procedures, but with procedures which exercise more aversive control (Baumeister & Rollings, 1976; Russo, Carr & Lovaas, 1980).

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Smolev (1971) writes: "...while nonaversive procedures may be preferable to aversive control because they involve less discomfort for the subject such procedures may allow subjects to injure themselves, a behavior that might be quickly suppressed with punishment. Therefore, when danger to the subject, or staff limintations, preclude the use of extinction, differential reinforcement, punishment is indicated." Dorsey, Iwata, Ong, and McSween (1980) write: "...although the continued refinement of reinforcement based procedures remains critical, additional research on the use of more restrictive techniques is also warranted. Punishment has been found to be the most consistent of all behavioral treatments in reducing self-injurious behavior. ...and in cases where DRO, extinction, etc. are either ineffective or exceedingly slow acting punishment may represent one of the few alternatives."

There are two broad categories of aversive procedures for the reduction of inappropriate behaviors (Alberto & Troutman, 1982). First is procedures which use conditioned aversives. These are procedures which result in psychological or social discomfort to the subject. These include use of consequences such as verbal reprimands, warnings, and activities. Second is procedures which use unconditioned aversives. These are procedures which result in physical pain or discomfort to the subject. These include use of consequences such as trauma and shock. It is evident that use of conditioned aversives has had little initial impact upon reduction of the behaviors in question. The use of unconditioned aversives is of highly questionable professional and ethical concern in the publicschool classroom; and result in an array of undesirable side effects. With these considerations in mind one can identify a growing body of literature which presents a set of procedures which may be labeled as "mild" aversives. In comparison with conditioned and unconditioned aversives, mild aversives may be seen as resulting in annoyance or irritation to the subject. This set of mild aversive procedures has the effect of significant behavior reduction, and should not present similar ethical concerns when employed appropriately. Mild aversives may include the use of a form of nonseclusionary time-out known as facial screening, the administration of certain substances, to include water, citric acid, and aromatic ammonia; and the use of negative practice.

Facial Screening

Facial screening (a.k.a. visual screening) is a form of nonseclusionary time-out by which at the onset of an instance of inappropriate behavior the practitioner covers the subject's face blocking out all visual stimuli. This procedure has been conducted with the use of a terry-cloth bib or use of the practitioner's hand. Zegiob, Jenkins, Becker, and Bristow (1976) employed facial screening with a young schizophrenic child who engaged in stereotypic hand-clapping behavior. The procedure involved the use of a terry-cloth bib which was pulled loosely

over the child's face for ten seconds concurrent with the presentation of a verbal reprimand. If the behavior continued, the bib remained over the child's face until he stopped clapping for three seconds. This procedure was conducted during language training sessions in which the student was being asked to imitate sounds and words. At the end of the procedure the child had gone from a mean of 8.17 minutes of hand clapping to a mean of 0.6, and from a baseline mean of 7.5 correct verbal responses to a mean of 27.3 correct verbal responses. At two and six month post checks, following the fading out of the facial screening, hand-clapping was at zero levels. Zegiob, Alford, and House (1978) used a terry cloth bib, this time with a profoundly retarded boy and instances of self-striking. Through use of this same procedure the suppressive effects generalized to non-consequated acts such as striking objects, self-biting, body rocking, and flapping.

Lutzker (1978) also used facial screening by placing a terry cloth bib over the face and head of a twenty-year-old male contingent upon the occurrence of head and face slapping with hands and fists. The placement of the bib was concurrent with a verbal reprimand. The bib was held over the subject's face until he had stopped the behavior for three seconds. Lutzker employed a multiple baseline across three classrooms. In Classroom A there was a baseline mean of 70 occurrences of self-injurious behavior in a thirty minute session. Following treatment this was reduced to a mean of five occurrences of self-injurious behavior. In Classroom B there was a baseline mean of 61 occurrences; following treatment this was reduced to a mean of five occurrences. In Classroom C there was a baseline mean of 53 occurrences; following treatment this was reduced to a mean of two occurrences.

Singh (1980) employed facial screening using a terry cloth bib with an eleven-month-old severely retarded, cerebral palsied infant. The infant had been thumb biting to the point where there was severe flesh damage. Sessions were multiple baseline across two time periods, one prior to the afternoon nap and one prior to being put down for the night. Each time the infant bit himself he was verbally reprimanded, his thumb was taken out of his mouth, the bib was quickly placed over his face and head and held loosely at the back of his head for approximately three seconds. Intervention lasted for 23 sessions. Follow-up was conducted once per month for twelve months and the behavior remained at zero levels.

McGonigle, Duncan, Cardisco, and Barrett (1982) employed visual screening with the experimenter covering the subject's eyes with his hand contingent upon the occurrence of the inappropriate behavior. This study was done with four children, two nine-year-old moderately retarded children who engaged in stereotypic waving of objects and vocalizations; and two 13-year-old profoundly retarded children who engaged in self-injurious behaviors. Treatment was conducted both in the

classroom and in their group home. The therapist placed one hand over the child's eyes while holding the back of the child's head with the other hand. Duration of the visual screening treatment was a minimum of five seconds for each child. Criterion for release from visual screening was contingent upon nondisruptive behavior following expiration of the minimum time requirement. Following treatment all children were brought to zero rates. The moderately retarded children remained at zero rates at 12 and 18 month follow-ups, and the profoundly retarded children remained at zero rates at six month follow-ups.

Use of Substances

Water misting: Dorsey, Iwata, Ong, and McSween (1980) employed the use of a water mist as a mild aversive consequence for the self-injurious and stereotypic behaviors of seven subjects. The six females and one male ranged in age from five to 26-years-old. Their inappropriate behaviors ranged from the mouthing of objects (for some of whom this resulted in vomiting or hand biting), to head banging and tearing of flesh from the lips and forearms. The procedure involved the application of a fine mist of water directed toward the subject's face contingent upon the occurrence of the targeted behavior. Tap water was sprayed using a standard plastic plant sprayer. Within four sessions of the introduction of the water misting, self-injurious behaviors decreased to below 5% of the baseline intervals. When compared to baseline, behaviors were suppressed an average of 51.5% during initial treatment phase and 60.1% in the second treatment phase. All subjects at the completion of the intervention were brought to zero rates of occurrence. In discussing their treatment the authors noted certain cautions in the use of a water mist procedure: 1) water remaining on the face and clothing might occasion or exacerbate colds or other illnesses, 2) no sessions were or should be conducted when symptoms of a cold or fever are existing, 3) at initial sessions considerable amounts of water were used and therefore a thorough towel drying of the child may be necessary, 4) it is possible that prolonged facial exposure to water might produce chapped skin requiring the application of a surface treatment (e.g., petroleum jelly) either before or after sessions or at various times throughout the day.

Citric acid: Citric acid (lemon juice) has been used for reduction of a diverse group of behaviors. Sajwaj, Libet and Agras (1974) used lemon juice for the control of life-threatening rumination in an infant. Five to ten ml. of Real Lemon lemon juice was squirted into the infant's mouth whenever rumination or its precursors were detected (i.e., tongue thrusting). For the next 30 to 60 seconds no lemon juice was administered. The procedure lasted for eight weeks. In baseline the infant ruminated during 40 - 70% of the intervals. Following treatment this was reduced to 10% and then near zero rates. Twelve month follow-up indicated no further instances of rumination.

Cook, Altman, Shaw, and Blaylock (1978) employed the contingent use of lemon juice to eliminate public masturbation by a severely retarded seven-year-old boy. The lemon juice was contingently administered during six random periods of time during the day. Upon initiation of the target behavior the teacher or aide and subsequently the mother would squirt five to ten ccs. of lemon juice into the boy's mouth with a plastic squirt bottle. After sixteen treatments with the citric acid (13 days) the subject was down to zero rates of occurrence. The intervention was terminated when zero rates were maintained for 11 consecutive days. A follow-up was conducted for one week following six months and the behavior was seen to remain at zero rates.

Mayhew and Harris (1979) employed citric acid to decrease the self-injurious behavior of a 19-year-old profoundly retarded young man. The subject was engaging in fist and hand striking of his head, head to door and hard objects behavior, and screaming. These authors used a solution of one ounce of food grade citric acid to one quart of water, a solution similar in taste to commercially available concentrated unsweetened lemon juice. Never more than two ounces per day were administered. During treatment sessions when the targeted behavior occurred the experimenter first shouted "no." If the subject ceased immediately for 15 seconds nothing else was done. If the behavior was emitted again within 15 seconds the experimenter shouted "no" and squirted the lemon juice into the subject's mouth. During baseline the subject engaged in 11 occurrences of the self-injurious behavior per minute and screamed for 96% of the intervals. When the citric acid was administered these behaviors were reduced such that self-injurious behavior was occurring .46 times per minute, and there were no intervals of screaming. When a reinforcer was then paired with the administration of the citric acid for appropriate head orientation to the trainer, the self-injurious behavior was reduced to zero levels and the screaming was maintained at zero levels.

Aromatic ammonia: Tanner and Zeiler (1975) used the contingent use of aromatic ammonia with a 20-year-old autistic woman who engaged in self-slapping accompanied by vocalizations and screams. The experimenter used crushable capsules of the Burrough's Wellcome Company. A capsule of ammonia was crushed and thrust under the subject's nose when she slapped herself, and was withdrawn when she stopped. The ammonia was used whenever the young woman brushed her hair back from her forehead since it was observed that the slapping behavior was always preceded by this movement (although the movement was not always followed by slapping). During baseline the subject engaged in a mean of 36.2 slaps per minute. During the initial treatment phase this behavior was reduced to a mean of 0.7. In a second treatment phase capsules were administered by all staff who came in contact with the subject and behavior was reduced to zero occurrences. A twenty-one day follow-up indicated zero rates being maintained.

Baumeister and Baumeister (1978) used aromatic ammonia with two severely retarded children to suppress mouthing of fingers which was causing lesions, face and leg slapping and hair pulling. All staff who came into contact with the children were involved from the beginning of this study. Because of the high frequency of the behavior of the four-year-old he was placed on a variable schedule of punishment. The contingency was in effect for a two minute period about once every fifteen minutes. As the response rate decelerated the relative frequency of the punishment was increased, the objective being to reach the point at which each response was punished. Ammonia was held under the nose until the first clear indication from the child's behavior (struggling, coughing, crying) that fumes had been inhaled. For the seven-year-old the same procedure was in place, but her rates were lower so she was on a CRF schedule for the punishment. The four-year-old had a mean baseline of 52.4 instances per minute. By the fourth day of treatment this was completely suppressed, and was so for two months. A follow-up four months later indicated only three occurrences of the behavior. For the seven-year-old baseline slapping was 11.3 per minute, hairpulling 5.6 per minute. By the fifth day of treatment the behaviors were completely supressed, and at follow-up there were no reoccurences.

Altman and Haavik (1978) employed this same intervention with a four-year-old severely retarded, cerebral palsied child who engaged in hair pulling behavior. The intervention demonstrated the effectiveness of contingent use of ammonia in deceleration of the hair pulling and it was generalized with family members and school personnel supressing the behavior in the home, the grandparents' home, and in the school.

Singh (1979) demonstrated the effectiveness of ammonia capsules with a 15-month-old who held his breath. Whenever the infant held his breath the experimenter thrust a vial of aromatic ammonia and held it four inches away from the nose and issued the verbal reprimand "no, don't do that." After each episode there was three minutes of ignoring. If after three minutes there was no breath holding, the infant was cuddled. During baseline the infant engaged in a mean of 1.2 episodes of breath holding per day, a mean of 76.7 seconds. Following the first five days of treatment there were only five episodes, of five to ten seconds in length. In the second five days there were no episodes of breath holding.

In discussing the use of this procedure the various authors noted certain cautions: 1) check with a physician for medical contradictions that might be associated with ammonia inhalation, 2) immoderate use, or undiluted forms would be destructive to the nasal mucosa. However, though the fumes are very unpleasant they appear to produce no lasting effect when used moderately and in diluted form, 3) if the subject begins to mouth breath cover the mouth.

Negative Practice

Negative practice is a reduction procedure wherein the student is required to engage in exaggerated experience with the inappropriate behavior. The goal of negative practice is for behavior reduction through response fatigue. Alberto, Powell, Troutman and Sharpton (1982) used a negative practice procedure with an 11-year-old female diagnosed as severely retarded and severely disturbed. The youngster engaged in hand flapping behavior. She was seated directly in front of the teacher during motor imitation instruction sessions. Each time she began hand flapping, instruction was stopped. The teacher delivered a sharp verbal reprimand, took the subject's hands and guided flapping them for 30 seconds. The teacher then sharply said "no more," waited five seconds and began the next imitation trial. During baseline the subject engaged in a mean of 123 flaps per ten minute session. Following intervention the behavior was brought to near zero rates; and appropriate responding to imitation instruction was brought to criterion. Six month follow-up data indicated the maintenance of hand flapping behavior at near zero rates.

Discussion

To date the data indicate that the use of mild aversives presents the teacher with an effective means of behavior reduction without the ethical and professional disadvantages associated with the use of unconditioned aversive stimuli, nor the disadvantage of delayed effect associated with the use of differential reinforcement strategies. In addition to the effectiveness of these procedures the various authors have noted several other advantages: 1) they are easily administered during instructional sessions, 2) they are portable across settings, 3) it is easy to train various school/institutional personnel and family members, 4) they can be administered immediately following the inappropriate response, 5) they have no lingering effects, 6) no harm comes to the student if carefully administered, and 7) they are low in cost.

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